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Commercial controlled environment (CE) food crop production in the United States has been around for over a hundred years. It increased in popularity until the Great Depression, then stagnated until the late 1980s. Between 1988 and 2014, the wholesale value of CE food production in the U.S. increased from \$64 million to \$797 million (adjusted for inflation; U.S. Census of Horticultural Specialties).

Top CE food crops in the U.S. in 2014 included tomato (87.3 million kg), fresh cut herbs (16.1 million kg), cucumber (12.0 million kg), lettuce (9.9 million kg), pepper (3.5 million kg), and strawberry (0.3 million kg).

Commercial, production-scale hydroponics greenhouses for food production emerged across the U.S. in the early 1970s. A common description of hydroponics, used in the U.S. Census for Horticultural Specialties, is growing crops "in nutrient solutions without soil". Overall, approximately  $\frac{3}{4}$  of CE food crops are produced hydroponically, although this varies by crop. In 2014, 91% of cucumbers, 86% of tomatoes, 70% of lettuce, and 21% of fresh cut herbs were produced hydroponically.

As the CE industry continues to expand, it is essential to focus research and extension efforts towards topics most beneficial to current and future producers. Therefore, a 23-question [online survey](#) was conducted in 2017, asking respondents about their business operations, production practices, and research priorities, and it received 42 responses.

Results from this survey will help establish baseline data on the variability in production type, technology adoption, and research needs of hydroponic food crop producers; identify gaps in both knowledge and technology adoption; and educate future industry members on current practices.

## Summary of Findings

### Production systems:

- 53% of respondents solely produced food crops hydroponically
- 38% grew crops indoors
- Nutrient-film technique was the most common; dutch or bato buckets and raft or deep-flow technique were also used

### Technology adoption:

- ~50% of growers use supplemental lighting and ~20% use sole-source lighting
- >80% of respondents monitor air temperature and nutrient solution pH and EC

### Research Priorities:

- Managing the growing environment to improve flavor
- Developing production recipes
- Managing light quality
- Food safety and post-harvest

## Take-Home Message

- Quality, in addition to yield, is an important consideration for CE food crop production
- Research and extension activities will be vital to continued industry growth

